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THE UNIVERSITY OF ALBERTA

AN EXPERIMENTAL ANALYSIS OF THE EFFECT OF DIRECT AND VICARIOUS PARTICIPATION IN PHYSICAL ACTIVITY ON SUBJECT AGGRESSIVENESS

by

© LARRY McKENZIE LEITH

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

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THE UNIVERSITY OF ALBERTA

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ABSTRACT

The primary purpose of this thesis was to examine the effect of direct and vicarious participation in physical activity on subject aggressiveness.

In the direct participation category, the independent variables were inter-participant task strategies (co-operative, competitive, and competitive-aggressive), task outcome (win or lose), and subject arousal (angered or non-angered). The various combinations of the three preceding variables constituted twelve treatment groups.

In the vicarious participation category, the independent variables were task strategy viewed (co-operative, competitive, and competitive-aggressive), and subject arousal (angered or non-angered). The various combinations of the two preceding variables produced six treatment groups.

Ten different high school boys were randomly assigned to each of the eighteen treatment groups and exposed to their respective experimental manipulations.

Subject aggression scores in both the pretest and post test conditions were obtained by use of the Aggression Machine and the Buss-Durkee Questionnaire. As an additional measure, subject-accomplice likeability was ascertained in the post experiment

setting.

Difference scores from the pretest to the post test conditions were subjected to analyses of variance, and orthogonal contrasts (when applicable) to determine which treatment sums were significantly different.

The data obtained from the present study supported the hypotheses that task strategy and task outcome would significantly effect the amount of elicited aggression in the direct participation category. No supportive evidence was found for the hypothesized difference between angered and non-angered arousal conditions. Subject likeability was significantly effected by task strategy and subject arousal.

In the vicarious participation category, the strategy of physical activity viewed yielded significant differences, as hypothesized, in terms of elicited aggressiveness. Once again, the hypothesized difference between angered and non-angered subject arousal conditions was not supported in the present study. Only subject arousal was found to exert a significant influence on subject-accomplice likeability in the vicarious participation category.

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> Man has more than a detached, scholarly interest in aggression. His difficulty in living harmoniously with nature and with his fellow man now threatens all forms of life, and his own future may depend on his ability to understand and control aggressive behavior
>
> (Johnson, 1972:1)

CHAPTER I

I. INTRODUCTION

> Sport permeates any number of levels of contemporary society, and it touches upon and deeply influences such disparate elements as status, race relations, business life, automotive design, clothing styles, the concept of the hero, language, and ethical values. For better or worse, it gives much form and substance to much in American life (Boyle, R., cited in Kenyon, 1969:3-4)

In considering the preceding quote, Kenyon has argued that the magnitude of sport in the Western world justifies its consideration as a social institution. Any phenomenon enjoying this degree of popular support should be closely analysed in an attempt to establish the effects of direct or vicarious participation on the participant and spectator involved. In actual fact, however, little research has attempted to analyse the role of sport or physical activity in the acquisition and modification of participant and spectator behavior.

Over the years, sports have been endorsed and encouraged in our society based on the intuitive assumption that they possess a "character building" quality. Some unique feature was attributed solely to sports which set them apart from other forms of societal behavior.

The origin of this character building viewpoint likely stems from the popular theory of catharsis, first formulated by Aristotle

in his theory of tragedy. Aristotle believed emotions could be purified by viewing stage performances. According to the adherents of this theory, aggressive behavior may be "purged" by either directly engaging in an aggressive act, or merely viewing one of the same. Freud's (cited in Strachey, 1959) view of catharsis entails the performance of the sexual act, thereby releasing tensions. This theory follows a hydraulic scheme, whereby tension rises, then displeasure increases until this libidinal energy found an outlet in the sexual act.

The theory of catharsis was soon to be transferred into the sporting milieu. Sport was attributed a character building quality by means of catharsis (i.e. aggressiveness would be purged). Several researchers thus saw sport as an instrument by which aggression may be released (Brill, 1929; Gardner, 1952; Garth and Mills, 1961; Kluckhohn, 1968; Lorenz, 1963; Menninger, 1948; Simmel, 1955; Stokes, 1958; and Storr, 1968).

The belief that sport decreases aggressive behavior in the participant or spectator, however, has come under considerable attack. Berkowitz 1962:204), in discussing the effect of sport on aggressiveness, sums up as follows:

> ... research suggests that competition is more likely to enhance than to decrease the strength of an individuals aggressive inclinations.

Skinner (1953:374) agrees:

> It is also a tenable hypothesis that competitive sports generate rather than relieve aggressive tendencies.

In summary, this aggression-reducing effect of sport is characterized by a lack of experimental support. The same status also holds for the theory of catharsis itself. Extensive reviews of the literature have been made by Berkowitz (1958;1962), Buss (1961), McNeil (1959), and Geen, Stonner, and Shoppe (1975), and as Berkowitz (1965:196) states: "qualitative research has not been consistently kind to the catharsis hypothesis". In spite of the large number of studies investigating catharsis, there have been few studies dealing specifically with the effect of sports and/or physical activity on participant/spectator aggressiveness. The studies which have been done to date appear inconsistent.

Studies by Husman (1955), and Stone (1950) have indicated that direct participation in sports results in lessened participant aggressiveness. Ryan (1970) found the opposite effect. In regard to the viewing of sports, Mann (1974:43) suggests that "following defeat, fans of the losing team react in a manner which functions to protect the teams standing and by extension their own feelings of pride". Similar results were found by Hastorf and Hadley (1954:133), who sum up as follows: "In brief, the data here indicate that there is no such thing as a game existing 'out there' in its own right which people merely observe". Both of the preceding studies would indicate a need for a study examining the effect of viewing sports on the spectators. Hartman (1969), Turner (1970), Goldstein and Arms (1971), Berkowitz and Alioto

(1973), and Leith (1973) have found that the viewing of aggressive sports results in increased spectator aggressiveness. Kingsmore (1970), and Eastwood (1974) report an opposite effect. Several reasons may be responsible for this inconsistency of results. Most of the studies cited deal with real-life situations. Along these lines, both Berkowitz (1962) and Ryan (1970) feel that adequate control is not possible in this type of setting. This view may be summed up as follows: "... such life-like conditions generally do not provide the degree of control necessary for adequate tests of the catharsis hypothesis, and we will have to resort to formal laboratory experiments for more definitive information" (Berkowitz, 1962:203).

Another major problem is that investigations of the catharsis hypothesis have not always differentiated between instigation to aggression arising from frustration (i.e. anger), and an individual's customary level of aggressiveness. In other words, although an immediate frustration-elicited hostility may be lessened, it seems unlikely that sport or physical activity has the potential to eliminate aggressive habits which have been acquired over many years of the individual's existence. This important distinction has not been taken into account in previous research. For this reason, an experiment is needed to examine the effect of physical activity on aggressiveness as it pertains to an immediate state or a more general underlying predisposition.

Another important consideration which has been consistently overlooked is that regarding outcome of participation in the

physical activity, or the viewing of such an event. Ryan (1970), Volkamer (1972), Lefebvre and Passer (1974), and Wankel (1973) have examined the relationship between winning or losing outcomes on elicited subject aggressiveness. Only Ryan's (1970) study involved a laboratory setting. Even so, the summed results of the preceding studies are contradictory at best. Goldstein and Arms (1971) have included outcome as a factor worthy of consideration in elicited aggressiveness as it pertains to viewing participants in the sporting milieu. In the latter study, increased aggressiveness was found in the fans of both the winning and losing teams. In view of the aforementioned studies, research is definitely needed to ascertain the effect of participation outcome on subject aggressiveness and its relationship to the type of activity engaged in, and the participant's level of arousal.

A final major criticism is that previous research has, to a large extent, neglected the relationship between type of activity and resultant aggressiveness. More specifically, the role of competition has been overlooked in favor of the aggressive model theory. This appears to be an oversight in view of the research done by Berkowitz (1962), Deutch (1949), Dunn and Goldman (1966), Hammond and Goldman, (1961), Sherif (1966), and Sherif and Sherif (1953), regarding co-operation and competition. Each of these and additional studies shall be examined in the following chapter. Even more obvious is the fact that no study has been found attempting to relate the effect of co-operative physical activity to elicited aggressiveness. Summing up on this point, there is an obvious need

to examine the relationship between co-operative, competitive, and competitive-aggressive physical activity strategies with elicited subject aggressiveness.

From the preceding information, the following questions arise:

1. What effect has the type of physical activity on participant aggressiveness?
2. What effect has winning or losing at a physical activity on participant aggressiveness?
3. If physical activity (direct or vicarious) does have the potential to decrease subject aggressiveness, is it limited to an immediate angered state or rather a more general underlying predisposition?
4. What effect has the type of physical activity viewed on participant aggressiveness?

The present study is an attempt to answer these questions, and ultimately arrive at a comprehensive and empirically based understanding of the effect of physical activity on participant and spectator aggressiveness.

II. THE PROBLEM

The purposes of this study are:

1. To examine the relationship of co-operative, competitive, and competitive-aggressive game strategies to elicited participant and spectator aggressiveness.
2. To examine the effect of both direct and vicarious participation in a physical activity on subject aggressiveness.
3. To examine the effect of participation outcome to elicited subject aggressiveness.

4. To examine the effect of subject arousal state to elicited aggressiveness in the participant and spectator. More specifically, to examine the effect of physical activity on subject aggressiveness as it relates to an immediate angered state as well as a more general level of trait aggressiveness.

5. To obtain a more comprehensive, empirically based understanding of the relationship between physical activity and aggressiveness in the participant and the spectator.

6. To test the following hypotheses:

   a) No significant difference in aggressiveness will be experienced by the co-operative treatment group.

   b) That competitive and competitive-aggressive treatment conditions will actually result in an increase in measured aggressiveness, with the latter condition displaying the largest increase of the two.

   c) That subjects in the angered arousal condition will display a greater decrease in subject aggressiveness than those individuals in the non-angered condition (in both the direct and vicarious categories).

   d) That a losing outcome will be accompanied by a significantly greater amount of subject aggressiveness than a winning outcome.

   e) That the viewing of a competitive-aggressive physical activity will result in a significant increase in subject aggressiveness, as compared to co-operative or competitive physical activity films.

   f) That no group will experience a significant decrease in subject aggressiveness as a result of their respective experimental manipulations.

III. IMPORTANCE OF THE STUDY

What effect has direct or vicarious participation in physical activity on subsequent aggressiveness?

What effect has winning or losing on participant aggressiveness?

What effect has the type of arousal prior to engagement in physical activity on resultant aggressiveness? More specifically, does engagement in physical activity have any effect on a participant's general aggressiveness, or is it restricted to a more or less immediate angered state?

Do different types of physical activity (i.e. co-operative, competitive, or competitive-aggressive) have different aggression-inducing effects?

Are physical activities indeed cathartic, or do some actually tend to increase participant aggressiveness?

These are some of the questions which must ultimately be answered if we are truly concerned with the effect of physical activity on the participant or spectator involved. We have too long perpetuated lip-service regarding the value to physical activity to the participant. The time has now come to add or delete experimental support to the claim that physical activity has a major function of providing a cathartic release of subject aggressiveness.

The present study is an attempt in this regard.

IV. DEFINITION OF TERMS

Catharsis. Catharsis refers to the assumption "that either vicarious participation in, or the direct expression of, aggressive behavior serves to discharge 'pent-up' energies and emotions, and thereby to reduce, at least temporarily, the incidence of aggressive behavior" (Bandura, 1969:159).

Goal Aggression. Goal aggression is defined as any attempt to harm a person or object by physical, verbal, or symbolic means. Aggression in this sense, is performed as an end in itself. Goal aggression has also been referred to as drive-mediated aggression, or hostile aggression, by Feshbach (1970).

Instrumental Aggression. Instrumental aggression is operationally defined as those aggressive acts performed in an attempt to gain an advantage (be it physical or psychological) over another individual. Instrumental aggression is performed as a means towards an end, and not as an end in itself.

Inter-Participant Co-operative Physical Activity. An inter-participant co-operative physical activity is defined as a non-zero sum contest. In this category, participation does not result in a winner or a loser in regard to the participants, rather both individuals either win or lose together. An arbitrary criterion score was used as the basis of success or failure of the participants.

Inter-Participant Competitive Physical Activity. An inter-participant competitive physical activity is one in which an individual's success is determined by some characteristic of his response relative to that of another individual.

Inter-Participant Competitive-Aggressive Physical Activity. This type of activity is one in which the outcome of the competition is determined by one's ability to use instrumental aggression to attain the participation goal.

CHAPTER II

REVIEW OF THE LITERATURE

Any attempt at defining the etiology of aggression must take into account the fact that one is not dealing with a unitary process. Aggression is a multidimensional concept.

As Johnson (1972:7) points out:

> The difficulty in agreeing on a precise and accurate definition of aggression may reveal something about its nature. Perhaps the inability to settle on a unitary definition indicates that we are not dealing with a unitary process, or a single set of antecedents or consequents.

In cognizance of this multidimensional concept of aggression, Chapter II will provide a summary of the major theories of aggression that have evolved to date.

Instinct Theory

Before discussing the best known representatives of the instinctivistic theory, a common feature may be delineated: the concept of the instinctivistic model in mechanistic-hydraulic terms.

McDougall (1913) believed that energy was held back by "sluice gates", which eventually would bubble over under certain conditions. Later, McDougall (1923) formulated an analogy in which each instinct was pictured as a chamber in which gas is

constantly liberated.

Similarly, Lorenz (1950) thought of instinctive energy as a liquid in a reservoir that can discharge through a spring loaded valve at the bottom. While the mechanistic-hydraulic element is common to the preceding theorists, the manner in which this energy becomes liberated is not met with common consensus.

Finally, Freud (1959) has postulated that man has two basic instincts. One is life preserving (eros), while the other has been termed the death instinct (thanatos). Although aggressive drives were considered innate, it was believed that the proper resolution of the Oedipus Complex would result in the necessary inhibitions for peaceful living.

Ethological Theory

Lorenz (1963) presents an interesting ethological point of view. He believes that man's main problem with aggression has stemmed from his being an omnivorous creature. Carnivorous animals were forced to develop inhibitions against killing members of their own species, since they possessed the natural weapons capable of causing species extinction. Man, being basically harmless structurally, did not develop these controls.

Tinbergen (1968) feels that man is still territorial by nature. He believes that a higher population density now should lead only to more "threats", not more actual fighting. He believes this upsetting of the balance between aggression and fear is caused by

"cowardice brainwashing", as well as mans' ability to make and use killing tools, especially long-range ones. He feels our only solution is to pursue the biological study of animals in an attempt to gain more insight into human behavior.

Freedman et al. (1970) support Lorenz's view. They contend that since fish will attack any available target when the original threatening fish is removed, this provides evidence that animals low on the phylogenetic scale do have some degree of instinct aggression.

Tiger (1969:167) presents yet another approach, asserting that human aggression is partly a function of the importance that hunting used to play in human evolution.

> Perhaps violence occurs in human relationships because profound confusions develop between killing people and killing animals. The process is the reverse of anthropomorphism.

Tiger also believes that aggression results from the human bonding process. He reasons that since males are prone to bond, and male bonds are prone to aggress, aggression is a predictable feature of human groups of males.

In summary, instinct and ethological theories of aggression have received much attention and publicity. Montagu (1968), however, points out the fact that these approaches are characterized by copious limitations. First of all, they display a general lack of methodological rigor. Secondly, they are characterized by unwarranted inductive leaps from animals lower on the phylogenetic

scale to man. Instinct theories also offer a very narrow conception of learning principles.

Scott (1970:13) provides additional support for the preceding criticism:

> Animals ... fight in the situations in which they have been trained to fight, and are peaceful in those in which they have been trained to be peaceful.

He concludes that since some animals can learn to control harmful aggression through the medium of play, aggression must take notice of basic learning principles, and hence cannot be entirely instinctive.

Finally, instinct theories do not take into account individual differences in the overt expression of aggressive behavior. Some individuals are better able to control their aggressive impulses than others. If aggression was truly instinctive, one would expect that aggressive behavior would be relatively constant from one individual to another. Since this is not the case, it must be concluded that additional factors have an effect on the elicitation of aggressive behavior.

Frustration-Aggression Hypothesis

One of the most popular theories of aggression was provided by Dollard et al. (1939). These individuals postulated that aggression is always a consequence of frustration. This statement was misinterpreted by many to mean that frustration always leads to

overt aggression. This misinterpretation, as well as the conflicting evidence cited below resulted in a basic revision, with the premise now reading:

> Frustration produced instigations to a number of different types of responses, one of which is an instigation to aggression (Miller, 1941:337).

The authors thus concluded that although frustration doesn't always lead to aggression, aggression is always caused by frustration. Over the past three and one-half decades, the frustration-aggression hypothesis has come under attack by several researchers. Buss (1961) has argued that frustration is not the only cause of instigation to aggression. He has demonstrated that attack has a similar effect. Berkowitz (1962) claims that both the original and revised frustration-aggression hypothesis are far too sweeping in view of the fact that experimental evidence shows that frustration does not always lead to aggression.

Scherer, Abeles, and Fischer (1975), in a book of readings, have pointed out that the definition of frustration is so vague as to be almost synonymous with "aversive experience". This leads to the problem of a difficult differentiation between frustration-induced and instrumental aggression.

Berkowitz (1968) has suggested that three major revisions are necessary in the frustration-aggression hypothesis.

1) A frustration arouses an emotional state, anger, that creates only a readiness for aggressive acts. This emotional state

also increases the strength of any ongoing response whether it is aggressive or not;

2) Aggressive responses do not occur, even given this readiness, unless suitable cues are present (stimuli associated with the present or previous anger instigation (Berkowitz, 1974:165-176);

3) Suitable cues may lead to aggressive behavior by arousing previously acquired aggressive habits. These habits can likely be formed without the learner being frustrated.

Although the frustration-aggression hypothesis has been among the most popular theories of aggression, the preceding criticisms and revisions lessen our confidence in explaining all aggression solely by this method.

Cultural Theory

If aggression has its roots solely in individual processes, then we could expect the level of aggression to be relatively constant from one society to another. Recent evidence, however, does not support this theory.

Whitt, Gordon, and Hofley (1972) have provided evidence indicating that nations vary greatly in their capacity for displaying violent aggression. Alland (1972) provides additional evidence in his study on the Semai Tribe of Malaya. His research indicates that murder is non-existent in the Malayan culture. He attributes this phenomenon to the fact that youngsters are never physically punished. Since they rarely see any form of violence, aggressive modeling cannot occur.

Bandura and Walters (1963) state that there is considerable evidence from cross cultural studies indicating that social class and ethnic differences play a major role in the acquisition of aggressive behavior. They state that the amount of overt aggression appears to be a function of the extent to which that particular social group encourages aggression. This view is supported by studies conducted by Bateson (1936), and Eaton and Weil (1955). Bateson (1936) has indicated that in the head hunting Iatmul Tribe, the scalping of enemies is positively reinforced by the status resulting from the act. In contrast, Eaton and Weil (1955) report that among the Hutterites, aggressive behavior is not sanctioned. This society stresses pacifism as an intrinsic value. Concomitantly, this culture is characterized by a lack of overt societal aggression.

In summary:

> To say that aggressive behavior is acquired and maintained through social learning processes is not to deny that it may have roots in biology or individual psychology, but merely that instances of violence may be best explained by looking to societal and group values regarding the use of violence, and the reflection of these values in socialization practices (Sheed, 1969:8).

Parent-Child Rearing Practices

Aggressive children are often assumed to have been reared by aggressive parents. This theory is best illustrated by the old cliché "like father, like son". McCord et al. (1961), however, have indicated that child rearing practices are far too complex to be classified in this manner. They argue that few parents would

willingly nurture their children to be aggressive. Johnson (1972) supports this notion by maintaining that most parents believe they are doing what is best for the child, even though their efforts may have the opposite effect.

Feshbach (1971) explains this inconsistency between intent and outcome by maintaining that the use of physical punishment is the highest related variable to the development of an aggressive personality. This theory is supported by the laboratory findings of Buss (1961), who found that verbal punishment may elicit stronger aggressive responses than would be obtained by merely frustrating the subject.

The relationship between child rearing practices and the development of aggressive children is further illustrated by the results of various correlational studies. Hoffman (1960) found that the overuse of unqualified power and severe discipline techniques correlated significantly with the amount of expressed hostility towards other children. Similar research by Bandura and Walters (1963) revealed that punitive fathers reared children with a greater tendency toward antisocial values than those children raised by nonpunitive discipline techniques. These results are further supported by the work of Glueck and Glueck (1950), and Bandura and Walters (1959).

Although these studies do establish correlation between child rearing practices and aggressive behavior in the offspring, they do not prove a causal relationship. Although punishment may result

in increased aggression, it may also be the case that aggressive children are likely to be punished more often. In summary the following represents a list (not in any particular order) of those child rearing practices most highly correlated with aggressive personality traits (Glueck and Glueck, 1950; Bandura and Walters, 1959; Hoffman, 1960; Bandura and Walters, 1963):

a) The use of physical punishment;

b) Parental permissiveness in the expression of aggression;

c) Parental conflict;

d) The mother's low esteem of the father;

e) Low demands and expectations placed on the child by his parents;

f) Inconsistent discipline techniques.

Modeling Theory

> Social learning and modeling theory appears to be especially relevant to human behavior and in recent years it has emerged as one of the most fruitful approaches to the social psychology of aggression (Johnson, 1972:147).

The role of observational learning in the acquisition of aggression has long been established. Research has indicated that both children and adults can acquire a wide variety of behavioral patterns, emotional reactions, and a number of attitudes through exposure to models (Larsen, 1968:4). Bandura, Ross and Ross (1961) have demonstrated that subjects showed an increase in imitative and non-imitative aggressive behavior after witnessing an aggressive model. Similar findings were provided by Bandura, Ross and Ross

(1963); Baron (1971); Walters and Thomas (1963); Bryan and Schwartz (1971); and Bandura and Huston (1961).

Bandura (1965:2) attempts to define observational learning in the following manner:

> It is evident from informal observation that vicarious learning experiences and response guidance procedures involving both symbolic and live models are utilized extensively in social learning to short-circuit the acquisition process and to prevent one-trial extinction of the organism in potentially dangerous situations.

Use of the term symbolic refers to evidence by Bandura, Ross and Ross (1963a) which suggests that modeling behavior occurs to the same extent when presented on film as when presented live.

Bandura and Mischel (1965) have further revealed observational learning to be equal in magnitude to live modeling when presented pictorially or verbally. Especially worthy of note, however, is the observation that aggressive modeling does not always result in aggression on the part of the viewer.

> The fact that watching aggression does not immediately instigate aggression does not necessarily indicate that nothing was learned. The observer may retain what he has learned from the model and perform it at some future time, perhaps the next time he is angry (Hicks, 1965:99).

Hicks (1965) and Goranson (1970) support this view, stating that modeling influences can be retained for many months before being expressed in action. Evidence also suggests that the effect of the

model depends upon their perceived social power, and the type of reinforcement they receive for the act (Bandura, Ross and Ross, 1963; and Goranson, 1970). Freedman, Carlsmith and Sears (1970:114) take a similar position, maintaining that "the more important, powerful, successful, and liked the model is, the more a child will imitate them."

Berkowitz (1965:301-329) has stated that the eliciting power of modeling stimuli is enhanced by the following four conditions:

a) the observer is angered;

b) the modeled aggression is socially justified;

c) the victim invites attack through his prior association with aggression;

d) the reinforcement contingencies for the aggressive act.

In summary, modeling appears to play a major role in the acquisition of aggressive responses. However, according to Bandura (1969), the degree and extent of modeled behavior will vary along the following two lines:

a) the individual's attention to the modeling cues;

b) the individual's past experiences as they relate to the given act.

The Effect of Mass Media on Aggression

As Schramm, Lyle, and Parker, (1961) have pointed out, the average child spends as much time viewing television as he spends in school. This example serves to illustrate the status enjoyed by television in the lives of young children. Various reasons have

been proposed in an attempt to account for the individual's fascination with television.

Maccoby (1954) suggests that children and adults watch television for the following reasons:

1) Television provides vicarious experiences free from real life controls. The individual can thus identify with the filmed transgressor with no fear of the punishment that would result if the act was real;
2) Television serves as a distractor from real life problems;
3) A form of wish-fulfillment is provided by television viewing, allowing the individual to act out in fantasy those responses which could not be performed in the real life setting.

Schramm et al. (1961) have proposed a different set of reasons:

1) It provides the individual with the passive pleasure of being entertained;
2) It keeps people from being bored;
3) Closely related to number 2), is that television serves a social utility function, giving boys and girls an excuse to enjoy each other's company;
4) People of all ages prefer incidental to purposeful, intentional learning, and as a result, turn to television as an educational source.

Whatever reason for this tremendous television appeal, it can safely be concluded that for the majority of people, the television screen

has become a second reality. Maccoby (1957) has suggested that this excessive television viewing can have two possible effects on the child, or adult. First of all, it may act indirectly, in a negative fashion, by taking the individual away from other activities. Secondly, a direct learning effect is possible. The latter instance is a major concern of this paper.

One of the most amazing findings that has come out of the extensive research on children and pictorial media (T.V. and movies) is the tremendous amount of incidental learning that takes place. Holaday and Stoddard (1933) were among the first to investigate this phenomenon. These researchers showed seventeen commercial films to children of different age groups. Among the most important findings was the large amount of incidental learning that occurred as a result of viewing the film. Moreover, when the subjects were retested three months later, approximately ninety percent of the recorded facts were recalled. Similar results were obtained in a later study by Hale, Miller, and Stevenson, (1968). In this study, an attempt was made to establish the amount of learning that occurred as it applied to incidental, non central details. Once again, the results supported the earlier findings of Holaday and Stoddard (1933).

Schramm (1972:16) sums up this situation as follows:

> There can be no doubt, in any case, that children learn a great deal from movies. They learn facts, roles, fashions, customs, what to expect of other people and of situations in which they are likely to find themselves. They learn attitudes and values. They learn no more than adults from a

> given film, but the experience comes to them in the years when they are filling their storehouses with the maps of the world and the guides to conduct that will lead them through adult life.

With this in mind, attention will now be turned to the experimental research dealing with the effect of filmed aggression on resultant behavior patterns in the viewer.

Reference was made earlier to the fact that research by Bandura, Ross and Ross (1961) indicated that exposure to aggressive, live models resulted in increased imitative and non-imitative aggressiveness on the part of the kindergarten sample tested. The same effect has also been observed to occur when the aggressive model is presented on film (Bandura, Ross and Ross, 1963a; Mussen and Rutherford, 1961; Thomas and Tell). Mussen and Rutherford (1961) found that children were more likely to say aggressive things after viewing an aggressive cartoon film. These results were further supported by Bandura, Ross and Ross (1963a), and Thomas and Tell (1974). In the former study, one group of subjects were exposed to real-life aggressive models. A second group observed the same models presented on film. A third group witnessed a film depicting an aggressive cartoon character. A fourth group served as a control, witnessing no aggression. The results indicated that those subjects who viewed the aggressive human and cartoon models on film displayed twice as much aggression as did those in a control group. Thomas and Tell (1974) found that although real models resulted in more aggression than fantasy models, both were responsible for a learned aggression effect. Additional evidence by

Bryan and Schwartz (1971), and Lovaas (1961), lends further support to the notion that the viewing of aggressive, animated cartoons leads to increased aggressive behavior on the part of the observer.

Similarly, Walters and Thomas (1963) presented a film displaying a knife fight to a selected audience. Before the film, each subject was given the opportunity to administer electric shocks to a confederate. The film was then shown, followed by another opportunity to shock the confederate. The results of the study indicated that after viewing the aggressive film, the subjects administered longer and stronger shocks.

It is tempting to interpret the preceding studies as suggestive of the fact that pictorial mass media, especially television, may serve as an important socializing agent in the acquisition of aggressive behavior. This viewpoint would be consistent with the recent research of Kniveton (1974), Thomas and Tell (1974), Geen and Stonner (1974), Diener, Dineen, Endresen, Beaman, and Fraser (1975), Geen (1975), and Harris and Samerotte (1975). On the other hand, Noble (1975) has found that stylized aggression may lead to a reduction of aggressiveness in children.

Eron, Huesmann, Letkowitz, and Walder (1972:262) sum up the available research as follows:

> The weight of evidence from this study when coupled with previous laboratory studies supports the theory that during a critical period in a boy's development, regular viewing and liking of violent television leads to the formation of a more aggressive life style.

Although the preceding quote enjoys tremendous support from available literature, it also tends to oversimplify the effect of filmed aggression on the viewer. Various other factors have been found to be responsible for determining the ultimate effect of media violence on the spectator. Doob and Climie (1972) have demonstrated that the most aggression is elicited in the immediate measurement condition. Given a period of delay before measurement, the amount of aggression displayed is significantly lower than in the immediate measurement condition. They explain this drop by a lowered state of arousal in the subject, resulting from the delay before measurement. Although a decrease was found in aggressive behavior after a temporal delay, it was also observed that this delay did not eliminate all of the aggressiveness resulting from the filmed violence. This study, then, would indicate some degree of retention from the witnessed film. This retention would be expected in view of the previously mentioned work by Hicks (1965), and Goranson (1970), indicating that modeled behavior may be retained for many months.

Bandura (1965) has suggested that the model's reinforcement contingencies have a significant influence on the acquisition of imitative aggressive responses. If the model receives positive reinforcement, then the viewer is much more likely to imitate his behavior than if he receives punishment, or any form of negative reinforcement. However, the author indicates that the same amount of learning occurs in each case, since the introduction of positive incentives completely eliminates any previously found differences

resulting from the negative reinforcement condition. This reinforcement theory gains additional support from the research of Berkowitz (1962), Walters et al. (1963), Bandura (1973), and Scherer, Abeles and Fischer (1975).

Meyer (1972) has provided evidence suggesting that justification of the filmed violence has a noticeable effect on the amount of imitated aggression. If the aggressive act is viewed as justified, this will lead to increased modeling of that behavior. In contrast, unjustified aggression decreases aggressive responses. Similar findings were reported by Berkowitz (1965), Berkowitz et al. (1963), and Turner and Berkowitz (1972).

Buss (1961) has demonstrated that if the viewer is angered or frustrated, it will increase the likelihood that aggressive behavior will be modeled as a result of the film. This finding is consistent with the research of Baron (1971), Berkowitz (1971), Hanratty et al. (1972), Turner and Berkowitz (1972), Carlisle and Howell (1974), and Baron and Bell (1975).

Finally, Berkowitz (1962) feels that the degree of association between the situation the observer finds himself in and the one portrayed by the media has an important effect on the amount of resultant aggression. The more similar the situation, the greater the amount of aggressive behavior that will occur in the post-film environment.

Summing up the research on the effect of mass media on aggressive behavior, the following points are especially worthy of consideration.

1) According to Berkowitz (1965), the viewing of aggressive films has three possible effects on the viewer:

   a) They teach the observer novel responses;

   b) They may result in disinhibition against acting aggressively, by showing the viewer that other people behave in an aggressive manner;

   c) They facilitate previously learned aggressive responses.

2) The amount of elicited aggression has been found to be a function of the following factors:

   a) The elapsed time from the media event;

   b) The reinforcement history of the model;

   c) The justification of the aggressive act;

   d) The situational degree of association with the filmed event.

To this list, Bandura (1969:132;136) would add the following two points:

   f) The attention the viewer pays to the modeling cues;

   g) The past experiences of the viewer as they relate to the modeled act.

Catharsis

The origin of the concept of catharsis may be traced to Aristotle's theory of tragedy. Aristotle believed that drama helped "purify" emotions by allowing people to express them.

The concept of catharsis has been used in two major contexts: it may refer to the direct reduction of aggression following an aggressive act; or it may refer to a reduction of aggression

following a vicarious act. After a cathartic experience, an individual is no longer aggressive because his aggressive energy has been released. The intuitive nature of the concept of catharsis has made it very popular among scientists and laymen alike. When exposed to the more rigorous standards of academic research, however, the concept of catharsis has come under considerable attack. Extensive reviews of the literature have been made by Berkowitz (1958;1962), Buss (1961), McNeil (1959), and Geen, Stonner, and Shoppe (1975), and as Berkowitz (1965:196) states: "Qualitative research has not been consistently kind to the catharsis hypothesis".

In spite of the large number of studies investigating catharsis, there have been few studies dealing specifically with the cathartic effect of sports and/or physical activity.

The Role of Sport in the Acquisition of Aggressive Behavior

Traditionally, sport has been perpetuated within our society due to its believed character building quality. This theory gained its support predominantly from ex-athletes and physical educators. Unfortunately, this concept is characterized by a paucity of experimental support. Simmel (1966) provides support for the role of sport in society. He believes that sport is a safety valve "which acts as a kind of riverbed for repressed drives, and thus preserves the rest of social life from their destructive impact" (Simmel, 1966:40). This cathartic theory of sport has been endorsed by a variety of scholars (Brill, 1929; Gardner, 1952;

Garth and Mills, 1961; Kluckhohn, 1968; Lorenz, 1963; Menninger, 1948; Stokes, 1958; and Størr, 1968). Stokes (1958) and Gardner (1952), in discussing team games, have both stated that catharsis is one of the major contributions of sport and physical activity. Similarly, Menninger (1948) has postulated that competitive games provide an unusually satisfactory social outlet for the instinctive drive of aggression. Lorenz (1963:242) has stated that "the main function of sport today lies in the cathartic discharge of aggressive urge". Storr (1968:159) agrees:

> ... competition can be regarded as a ritualization of conflict equivalent to the ritual conflicts of animals which diminish the likelihood of war rather than encourage it. In the same way, rivalry between nations in sport can do nothing but good; and it should be possible to encourage competition in other fields also.

As mentioned earlier, however, this cathartic view of sport is characterized by a paucity of experimental support.

> Although several prominent scholars have stated unequivocally that catharsis does occur among both participants in, and spectators of sport, the bulk of scientific evidence, it will be shown, indicates otherwise (Smith, 1972:22-23).

A Review of Studies Investigating the Relationship Between Aggression and Direct Participation in Physical Activity

Husman (1955) obtained the responses to a series of projective tests from groups of college boxers, wrestlers, cross-country runners, and non-athletes. This study indicated that the boxers were less aggressive than the other groups. However, they also

appeared to feel more anxious or guilty after a contest than did the controls, even though their aggression was socially sanctioned. Stone (1950) has also found indications of guilt or anxiety following a socially sanctioned athletic contest. A Thematic Apperception Test was administered to football players both during and after the athletic season. Their responses were then compared to those of a matched control group. While there was no difference between the groups during the season, the football players displayed significantly less aggression after the season than did their control counterparts. However, this aggressiveness was impersonally rather than personally oriented. Stone thus hypothesized that the lessened, impersonal aggression was due to anxiety because of the necessity of inhibiting overt aggression after the season.

Berkowitz (1962:205), in discussing the effect of competitive sports on aggression, points out the fact that "the Husman-Stone studies involved aggressiveness rather than an immediate frustration-elicited hostility, and aggressive sports probably do not eliminate aggressive habits".

Volkamer (1971), in conducting research on aggression in 1,986 soccer matches, found that aggression was significantly related to: a) the site of the game; b) the margin of victory or defeat; c) the league standings of the teams. He went on to conclude that the occurrence of aggressive acts in the soccer matches resulted primarily from frustrations resulting from the competition. He also concluded that his data was incompatible with the cathartic view on sports participation. Lefebvre and Passer (1974) analysed 240

soccer matches in the Belgian National Soccer League. The results of this study support Volkamer's (1971) finding in regard to increased aggression on the part of the visiting team. The findings also yielded general support that increased aggression results in losing teams, as well as teams in the most important division. Wankel (1973), analysing the 1971-72 OUAA hockey games, provides contradictory results to the preceding two studies. Game site, outcome, and score differential were not significantly related to increased aggression.

All in all, the findings to date regarding the relationship between aggression and physical activity are at best ambiguous. More controlled studies, in the laboratory setting are needed to help clear up the issue of aggression in sport.

A Review of Studies Investigating the Relationship Between Aggression and Vicarious Participation in Physical Activity

Several studies have attempted to analyse the effect of viewing sports and/or physical activity on spectator aggressiveness. Hartmann (1969) had high school boys witness a movie of a basketball game under one of three conditions. In one treatment group, two boys simply played basketball against one another, while in both of the two other groups, the two basketball players became engaged in a fight. Results indicate that viewing the fight led to heightened attacks (in the form of electric shocks) upon a person the subjects were required to punish for errors in a learning situation. Turner (1970) has demonstrated that the viewing of college football and basketball results in an increased frequency

of aggressive responses, as measured by a twenty item sentence completion test and six TAT cards. Goldstein and Arms (1971) report similar findings. Using three scales from the Buss-Durkee test of aggression, they found an increase in post-game hostility as a result of watching an aggressive football game. Leith (1973) provides additional support for the assumption that the viewing of aggressive sports leads to increased aggressiveness in the young spectator. In this particular study, those individuals viewing a boxing film displayed greater aggressiveness than did those subjects viewing a gymnastics meet or a control group. Berkowitz and Alioto (1973) found similar results, whereby subjects viewing either a boxing match or a football game displayed increased aggression after seeing the films. In contrast, Kingsmore (1970) has reported a significant decrease in subject aggressiveness after viewing a wrestling match or a basketball contest (as measured by six TAT cards and a questionnaire). Eastwood (1974) has reported no statistically significant increases or decreases in aggression as a result of viewing a hockey film.

The results of viewing sports and/or physical activity on the spectators are at present inconsistent. More research is needed in the area of modeled aggression as a result of viewing sporting scenes. The present study is an attempt in this regard.

CHAPTER III

METHODS AND PROCEDURES

The subjects were divided into eighteen treatment groups. Twelve groups participated in Part A of the experiment, while the remaining six groups participated in Part B.

Part A: Aggression and Direct Participation in Physical Activity

The twelve treatment conditions in Part A of the experiment, which were varied in regard to type of physical activity (inter-participant co-operative, inter-participant competitive, and inter-participant competitive-aggressive), participation outcome (win or lose), and subject arousal (angered or non-angered) were as follows:

Type of Inter-Participant Activity	Outcome	Arousal
1. Co-operative	Lose	Angered
2. Co-operative	Lose	Non-Angered
3. Co-operative	Win	Angered
4. Co-operative	Win	Non-Angered
5. Competitive	Lose	Angered
6. Competitive	Lose	Non-Angered
7. Competitive	Win	Angered
8. Competitive	Win	Non-Angered
9. Competitive-Aggressive	Lose	Angered
10. Competitive-Aggressive	Lose	Non-Angered
11. Competitive-Aggressive	Win	Angered
12. Competitive-Aggressive	Win	Non-Angered

Part B: Aggression and Vicarious Participation in Physical Activity

The six treatment conditions in Part B of the experiment, which were varied in regard to type of film-mediated physical activity viewed (co-operative, competitive, or competitive-aggressive), and subject arousal (angered or non-angered), were as follows:

	Type of Activity Viewed	Arousal
1.	Co-operative	Angered
2.	Co-operative	Non-Angered
3.	Competitive	Angered
4.	Competitive	Non-Angered
5.	Competitive-Aggressive	Angered
6.	Competitive-Aggressive	Non-Angered

I. EXPERIMENTAL DESIGN

The experimental design was such that a 3x2x2 factorial design was employed in Part A of the experiment, while a 3x2 factorial design was employed in Part B.

In Part A, the three levels of the first factor pertained to the physical activity strategy (inter-participant co-operative, inter-participant competitive, or inter-participant competitive-aggressive). The two levels of the second factor pertained to activity outcome (win or lose). The two levels of the third factor included angered and non-angered arousal conditions. All three factors were randomly assigned between subjects.

In Part B, the three levels of the first factor were as in Part A. The two levels of the second factor included angered and non-angered arousal conditions. Both factors were randomly assigned

between subjects.

The subjects were assigned randomly to one of the eighteen treatment conditions, which included:

i) a combination of one level from each of the three factors in Part A (3x2x2 = 12);

ii) a combination of one level from each of the two factors in Part B (3x2 = 6).

The dependent variables were the amount of shock employed in the pre-test/post-test conditions, and the scores on the Buss-Durkee Aggression Questionnaire in the pre-test/post-test settings.

As an additional measure, partner (accomplice) likeability* was determined at the conclusion of each testing session.

Additional qualitative data was obtained via a post-experiment questionnaire.

II. THE SUBJECTS

A sample of one hundred and eighty boys was obtained from a local high school. Grades nine, ten, eleven, and twelve were included in the present study. One hundred and twenty of these subjects were utilized in Part A of the experiment, and the remaining sixty in Part B.

Only boys were utilized in this experiment in an attempt to

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*A twenty-one point scale adopted from Aronson and Linder (1965).

eliminate any intervening variables resulting from the testing of both sexes. This approach is supported by studies (Hurlock, 1927; Strong, 1963; and Chevrette, 1968) indicating that sexes react differently to competition.

All testing was carried out at Wallaceburg District Secondary School, Wallaceburg, Ontario.

III. THE APPARATUS

The most common method of measuring aggression in the experimental setting is to employ the aggression machine, developed by Buss (1961).

The mode of aggression with this technique is the delivery of electric shock.

The subject is instructed to play the role of a teacher in a learning experiment. His task is to administer an electric shock whenever the subject of the "learning experiment" makes an incorrect response. The latter subject is actually an accomplice,* performing under standard instructions.

On the subject's side of the machine, there are ten switches, each paired with an indicator light, for ten different levels of shock. A power switch, fuse, and electrode lead also appear on the subject's side of the apparatus.

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*For additional information concerning the accomplice, see Appendix M.

On the accomplice's side of the machine, there are ten shock indicator lights which enable the accomplice to record the level of shock administered.

The shock is theoretically administered by means of electrodes fastened to the third and fourth fingers of the accomplice. In actual afact, however, the machine is not capable of administering any form of shock whatsoever. The calculated test-retest reliability of the machine is reported in Appendix H.

IV. SELF REPORT INSTRUMENT

Buss and Durkee (1957) constructed scales for each of the following independent areas of hostile behavior: assault; indirect hostility; irritability; negativism; resentment; suspicion; and verbal hostility. By means of item analysis, they constructed a seventy-five item questionnaire. In the proposed study, however, only five of the eight subsections listed above can be seen as relevant to the problem under consideration. The sub-categories of resentment, suspicion, and guilt are not in accordance with the operational definition of aggression to be used in this study.

The remaining five categories appear quite promising in regard to their potential for measuring aggressiveness. It is also possible to extract the desired subsections since they are independent measures (as was done by Goldstein and Arms, 1971).

The odd-even reliability, calculated in order that pre-test and post-test measures could be obtained, is reported in Appendix G.

This questionnaire technique was utilized as a supplement to the dependent measures on the aggression machine.

V. PROCEDURE

The subjects were admitted individually to the testing room. Upon entering the room, the boy was seated and introduced to the accomplice, who was presented as another subject taking part in the experiment. The two boys were told that one of them would be the "teacher", while the other would be the "learner". In actual fact, however, when the two boys were presented with the opportunity to draw cards to determine who would be the teacher and who would be the learner, both cards were labelled "teacher" so that the subject always assumed the teaching role. The accomplice had been previously instructed to say that his card read "learner". At this point in time, the subject and accomplice were given a set of common instructions (See Appendix A-I, A-II, and A-III) to read. Having read the instructions, in the angered arousal condition, the accomplice insulted the subject several times, thereby making him angry. Prior to the insult condition, the Experimenter left the room under the pretense that he was going to lock the downstairs door to the balcony. Having returned, the Experimenter instructed the boys to take up their positions on their respective sides of the "learning machine". Eye contact was prevented by means of a wooden barrier, since victim visibility has been shown to exert an influence on the amount of elicited aggression (Baron, 1974; Sanders and Baron, 1975; and Turner, Layton, and Simons, 1975).

At this point in time, the experiment proper began. As has been previously mentioned, the subject was instructed to shock the "learner" every time he made a mistake on the word association task (See Appendix E-I) provided. Twenty responses were required from the accomplice, with the Experimenter having predetermined that ten of these would be incorrect (See Appendix E-II). The accomplice was instructed to record the shock intensity delivered by the subject for each mistake.

Part A of the Buss-Durkee Aggression Questionnaire (See Appendix F-I) was administered at this time.

Having completed the first phase of the experiment, the subjects in Part A of the experiment, along with the accomplice, were given a set of instructions (See Appendix A-IV) regarding the type of physical activity in which they would engage. A description of these activities is provided in Appendix C-I, C-II, and C-III.

The subject and accomplice then engaged in a physical activity for approximately three to five minutes time.

In each instance, the Experimenter had predetermined whether the subject would win or lose.

In Part B of the experiment, the subject and accomplice were shown a filmed physical activity for an identical period of time. A description of these filmed activities is provided in Appendix D-I, D-II, and D-III.

At the conclusion of the physical activity, or filmed physical activity, the boys were once again instructed to take up their positions at the "learning machine", where the previous procedure was repeated with a different set of word pairs (See Appendix E-III). The accomplice made the same number of errors (See Appendix E-IV) in this phase of the experiment as he did in the first phase. Once again, the accomplice was instructed to record the shock level delivered for each of the ten errors.

The subject and accomplice were then asked to complete Part B of the Buss-Durkee Aggression Questionnaire (See Appendix F-II). Two additional pages of questions (see Appendix F-III and F-IV) were administered at this point in order to obtain certain qualitative data as well as the subject's perceptions of the various independent variables under consideration in the study. Subject-Accomplice likeability was also ascertained at this time.

Having completed this phase of the experiment, the subject was thanked for his co-operation, and sent back to class.

VI. TREATMENT OF THE DATA

Aggression scores were in the form of summated shock intensities and scores on the Buss-Durkee Aggression Questionnaire.

Differences from the pretest to the post test scores over the different factors and levels were subjected to analyses of variance to determine if any significant differences in elicited aggressiveness existed for the different treatment conditions tested. The

significant F values obtained for Factor A in both the direct and vicarious participation categories were subjected to orthogonal contrasts in order to determine which task strategy treatment sums were significantly different.

The same procedure was followed for analysing the likeability data. As an additional measure, a multiple comparison test was conducted to ascertain if any significant differences existed between a control mean and each factor level treatment mean.

CHAPTER IV

RESULT AND DISCUSSION

CHAPTER IV

RESULTS AND DISCUSSION

I. RESULTS - DIRECT PARTICIPATION

Aggression Machine

An analysis of variance performed on the summated shock intensity difference scores from the pretest to the post test conditions (Table I) yielded significant[1] differences for the mode of physical activity engaged in, and the outcome of that physical activity. These results indicate that inter-participant co-operative, inter-participant competitive, and inter-participant competitive-aggressive physical activities differ in their aggression-eliciting effects.

A losing outcome also differed significantly from that of a winning outcome in terms of elicited subject aggressiveness.

An application of orthogonal contrasts performed on the three levels of Factor A (Table II) indicated that the aggression-eliciting effect of an inter-participant co-operative physical activity differed significantly from inter-participant competitive and competitive-aggressive physical activities. No significant difference was found between the inter-participant competitive and

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[1] $p<.05$ was accepted as the criterion level for significance in this study.

TABLE I

ANALYSIS OF VARIANCE PERFORMED ON THE AGGRESSION MACHINE DATA IN THE DIRECT PARTICIPATION CATEGORY

Source	Sum of Squares	Degrees of Freedom	Mean Square	F Value
A	339.27	2	169.64	5.52**
B	168.04	1	168.04	5.46*
C	8.54	1	8.54	0.28
AxB	2.86	2	1.43	0.04
AxC	2.86	2	1.43	0.04
BxC	1.63	1	1.63	0.05
AxBxC	0.27	2	0.14	0.01
Within	3322.00	108	30.76	

**p≤.01
* p<.05

TABLE II

ORTHOGONAL CONTRASTS PERFORMED ON FACTOR A (MODE OF PHYSICAL ACTIVITY) AS MEASURED BY THE AGGRESSION MACHINE IN THE DIRECT PARTICIPATION CATEGORY

Contrast	Factor Level A_1 -12	A_2 122	A_3 138	$MS_{Di} = \frac{Di^2}{n\Sigma a.i^2}$	$F = \frac{MS_{Di}}{MSw}$
D_1	2	-1	-1	336.07	10.93**
D_2	0	+1	-1	3.20	0.10

**p<.01

competitive-aggressive physical activities. Comparisons of the factor level treatment means with a control revealed that competitive, competitive-aggressive modes, as well as a losing outcome produced significant increases in aggression as compared to a control mean (Table III).

Buss-Durkee Aggression Questionnaire

An analysis of variance performed on the Buss-Durkee difference scores from the pretest to the post test setting (Table IV) yielded significant differences for the mode of physical activity engaged in, and the outcome of that physical activity. These results, in conjunction with the data obtained from the aggression machine, indicate that inter-participant co-operative, inter-participant competitive, and inter-participant competitive-aggressive physical activities differ in terms of their aggression-eliciting potential.

Winning and losing outcomes were also found to exhibit differential aggression-eliciting effects.

An application of orthogonal contrasts performed on the three levels of Factor A (Table V) supported the findings obtained by use of the aggression machine. The inter-participant co-operative physical activity differed significantly from the inter-participant competitive and competitive-aggressive physical activities. Once again, no significant difference was found between the inter-participant competitive and competitive-aggressive physical activity strategies. Comparisons of the factor level treatment means with a control revealed that competitive, competitive-aggressive modes, as

TABLE III

MULTIPLE COMPARISON BETWEEN A CONTROL MEAN
AND EACH FACTOR LEVEL TREATMENT MEAN
(AGGRESSION MACHINE - DIRECT PARTICIPATION)

Factor Level Comparison	$\bar{X}_{K.} - \bar{X}_{0.}$
$\bar{X}_{A1.} - \bar{X}_{0.}$	9.60
$\bar{X}_{A2.} - \bar{X}_{0.}$	10.80*
$\bar{X}_{A3.} - \bar{X}_{0.}$	12.50*
$\bar{X}_{B1.} - \bar{X}_{0.}$	9.40
$\bar{X}_{B2.} - \bar{X}_{0.}$	11.40*
$\bar{X}_{C1.} - \bar{X}_{0.}$	6.20
$\bar{X}_{C2.} - \bar{X}_{0.}$	9.90

Critical t = 10.37

*$p \leq .05$

$\bar{X}_{0.} = 29.9$

TABLE IV

ANALYSIS OF VARIANCE PERFORMED ON THE BUSS-DURKEE QUESTIONNAIRE DATA IN THE DIRECT PARTICIPATION CATEGORY

Source	Sum of Squares	Degrees of Freedom	Mean Square	F Value
A	339.65	2	169.83	18.58**
B	106,40	1	106.40	11.64**
C	29.00	1	29.00	3.17
AxB	1.32	2	0.66	0.07
AxC	0.62	2	0.31	0.03
BxC	1.02	1	1.02	0.11
AxBxC	1.41	2	0.71	0.08
Within	987.50	108	9.14	

**p<.01

TABLE V

ORTHOGONAL CONTRASTS PERFORMED ON FACTOR A (MODE OF PHYSICAL ACTIVITY) AS MEASURED BY THE BUSS-DURKEE QUESTIONNAIRE IN THE DIRECT PARTICIPATION CATEGORY

Contrast	Factor Level A_1 -34	A_2 +88	A_3 +123	$MS_{Di} = \frac{Di^2}{n\Sigma a.1^2}$	$F = \frac{MS_{Di}}{MSw}$
D_1	2	-1	-1	324.34	35.49**
D_2	0	+1	-1	15.31	1.68

**p<.01

well as a losing outcome produced significant increases in aggression as compared to a control mean (Table VI).

TABLE VI

MULTIPLE COMPARISON BETWEEN A CONTROL MEAN AND EACH FACTOR LEVEL TREATMENT MEAN (BUSS-DURKEE - DIRECT PARTICIPATION)

Factor Level Comparison	$\bar{X}_{K.} - \bar{X}_{0.}$
$\bar{X}_{A1.} - \bar{X}_{0.}$	0.90
$\bar{X}_{A2.} - \bar{X}_{0.}$	5.80*
$\bar{X}_{A3.} - \bar{X}_{0.}$	6.50*
$\bar{X}_{B1.} - \bar{X}_{0.}$	3.70
$\bar{X}_{B2.} - \bar{X}_{0.}$	5.10*
$\bar{X}_{C1.} - \bar{X}_{0.}$	3.60
$\bar{X}_{C2.} - \bar{X}_{0.}$	4.20

Critical t = 4.74

*$p < .05$

$\bar{X}_{0.} = 9.60$

Likeability Scale

An analysis of variance performed on the likeability data collected at the conclusion of the testing session (Table VII) yielded significant differences for the mode of physical activity engaged in, and the subject's level of arousal prior to participation. These results indicate that inter-participant co-operative, inter-participant competitive, and inter-participant competitive-aggressive physical activities differentially effect participant likeability.

An angered state of arousal prior to participation also differed significantly from a non-angered state of arousal in terms of participant likeability.

An application of orthogonal contrasts performed on the three levels of Factor A (Table VIII) indicated that participant likeability after an inter-participant co-operative physical activity differed significantly from that of an inter-participant competitive and an inter-participant competitive-aggressive physical activity. No significant difference was found between the inter-participant competitive and competitive-aggressive physical activities in terms of participant likeability. Comparisons of the factor level treatment means with a control revealed that only a co-operative activity mode served to increase inter-participant likeability (Table IX).

TABLE VII

ANALYSIS OF VARIANCE PERFORMED ON THE ARONSON AND LINDER LIKEABILITY DATA IN THE DIRECT PARTICIPATION CATEGORY

Source	Sum of Squares	Degrees of Freedom	Mean Square	F Value
A	40.20	2	20.10	3.61*
B	3.67	1	3.67	0.66
C	25.20	1	25.20	4.52*
AxB	2.40	2	1.20	0.22
AxC	1.07	2	0.54	0.10
BxC	0.42	1	0.42	0.08
AxBxC	0.86	2	0.43	0.08
Within	601.10	108	5.57	

*p<.05

TABLE VIII

ORTHOGONAL CONTRASTS PERFORMED ON FACTOR A (MODE OF PHYSICAL ACTIVITY) AS MEASURED BY THE ARONSON AND LINDER LIKEABILITY DATA IN THE DIRECT PARTICIPATION CATEGORY

Contrast	Factor Level A_1 331	A_2 289	A_3 277	$MS_{Di} = \frac{Di^2}{n\Sigma a.i^2}$	$F = \frac{MS_{Di}}{MSw}$
D_1	2	-1	-1	38.40	6.89**
D_2	0	+1	-1	1.80	0.32

**p<.01

TABLE IX

MULTIPLE COMPARISON BETWEEN A CONTROL MEAN AND EACH FACTOR LEVEL TREATMENT MEAN (LIKEABILITY - DIRECT PARTICIPATION)

Factor Level Comparison	$\bar{X}_{K.} - \bar{X}_{0.}$
$\bar{X}_{A1.} - \bar{X}_{0.}$	3.38*
$\bar{X}_{A2.} - \bar{X}_{0.}$	2.33
$\bar{X}_{A3.} - \bar{X}_{0.}$	2.00
$\bar{X}_{B1.} - \bar{X}_{0.}$	2.75
$\bar{X}_{B2.} - \bar{X}_{0.}$	2.40
$\bar{X}_{C1.} - \bar{X}_{0.}$	2.12
$\bar{X}_{C2.} - \bar{X}_{0.}$	3.03

Critical t = 3.14

*$p < .05$

$\bar{X}_{0.} = 4.90$

II. RESULTS - VICARIOUS PARTICIPATION

Aggression Machine

An analysis of variance performed on the summated shock intensity difference scores from the pretest to the post test conditions (Table X) yielded a significant difference for the mode of physical activity witnessed. These results indicate that co-operative, competitive, and competitive-aggressive sports films differ significantly in terms of their aggression-eliciting potential.

TABLE X

ANALYSIS OF VARIANCE PERFORMED ON THE AGGRESSION MACHINE DATA IN THE VICARIOUS PARTICIPATION CATEGORY

Source	Sum of Squares	Degrees of Freedom	Mean Square	F Value
A	155.73	2	77.87	3.70*
C	7.35	1	7.35	0.35
AxC	0.40	2	0.20	0.01
Within	1135.50	54	21.03	

*$p < .05$

An application of orthogonal contrasts performed on the three levels of Factor A (Table XI) indicated that subject aggressiveness was significantly greater after viewing a competitive-aggressive physical activity than was the case after viewing co-operative and competitive physical activities. No significant difference was found between co-operative and competitive physical activity viewers in terms of elicited aggressiveness. Comparisons of the factor level treatment means with a control revealed that only a competitive-aggressive film served to increase subject aggressiveness (Table XII).

TABLE XI

ORTHOGONAL CONTRASTS PERFORMED ON FACTOR A (MODE OF FILMED PHYSICAL ACTIVITY) AS MEASURED BY THE AGGRESSION MACHINE IN THE VICARIOUS PARTICIPATION CATEGORY

Contrast	Factor Level A_1 41	A_2 33	A_3 105	$MS_{Di} = \frac{Di^2}{n\Sigma a.i^2}$	$F = \frac{MS_{Di}}{MSw}$
D_1	-1	-1	+2	154.13	7.33**
D_2	-1	+1	0	1.60	0.08

**p<.01

TABLE XII

MULTIPLE COMPARISON BETWEEN A CONTROL MEAN AND EACH FACTOR LEVEL TREATMENT MEAN (AGGRESSION MACHINE - VICARIOUS PARTICIPATION)

Factor Level Comparison	$\bar{X}_{K.} - \bar{X}_{0.}$
$\bar{X}_{A1.} - \bar{X}_{0.}$	1.70
$\bar{X}_{A2.} - \bar{X}_{0.}$	2.60
$\bar{X}_{A3.} - \bar{X}_{0.}$	7.50*
$\bar{X}_{C1.} - \bar{X}_{0.}$	1.20
$\bar{X}_{C2.} - \bar{X}_{0.}$	6.61

Critical t = 7.37

*p<.05

$\bar{X}_{0.} = 38.9$

Buss-Durkee Aggression Questionnaire

An analysis of variance performed on the Buss-Durkee difference scores from the pretest to the post test setting (Table XIII) yielded a significant difference for the mode of physical activity witnessed. These results, in conjunction with the results obtained from the aggression machine, indicate that co-operative, competitive, and competitive-aggressive sports films differ significantly in terms of their aggression-eliciting potential.

An application of orthogonal contrasts performed on the three levels of Factor A (Table XIV) supported the findings obtained by use of the aggression machine. Subject aggressiveness was significantly greater after viewing a competitive-aggressive physical activity than was the case after viewing co-operative or competitive physical activities. Once again, no significant difference was found between co-operative and competitive physical activity viewers in terms of elicited aggressiveness. Comparisons of the factor level treatment means with a control revealed that only a competitive-aggressive film served to increase subject aggressiveness (Table XV).

TABLE XIII

ANALYSIS OF VARIANCE PERFORMED ON THE BUSS-DURKEE QUESTIONNAIRE DATA IN THE VICARIOUS PARTICIPATION CATEGORY

Source	Sum of Squares	Degrees of Freedom	Mean Square	F Value
A	145.60	2	72.80	8.27**
C	1.67	1	1.67	0.19
AxC	21.73	2	10.87	1.24
Within	475.00	54	8.80	

**p<.01

TABLE XIV

ORTHOGONAL CONTRASTS PERFORMED ON FACTOR A (MODE OF FILMED PHYSICAL ACTIVITY) AS MEASURED BY THE BUSS-DURKEE QUESTIONNAIRE IN THE VICARIOUS PARTICIPATION CATEGORY

Contrast	Factor Level A_1	A_2	A_3	$MS_{Di} = \frac{Di^2}{n\Sigma a.i^2}$	$F = \frac{MS_{Di}}{MSw}$
	16	20	84		
D_1	-1	-1	+2	145.20	18.15**
D_2	-1	+1	0	0.40	0.05

**p<.01

TABLE XV

MULTIPLE COMPARISON BETWEEN A CONTROL MEAN AND EACH FACTOR LEVEL TREATMENT MEAN (BUSS-DURKEE - VICARIOUS PARTICIPATION)

Factor Level Comparison	$\bar{X}_{K.} - \bar{X}_{0.}$
$\bar{X}_{A1.} - \bar{X}_{0.}$	2.95
$\bar{X}_{A2.} - \bar{X}_{0.}$	2.30
$\bar{X}_{A3.} - \bar{X}_{0.}$	6.30*
$\bar{X}_{C1.} - \bar{X}_{0.}$	3.50
$\bar{X}_{C2.} - \bar{X}_{0.}$	3.80

Critical t = 5.35

*p .05

$\bar{X}_{0.} = 10.2$

Likeability Scale

An analysis of variance performed on the likeability data collected at the conclusion of the testing session (Table XVI) yielded a significant difference for the subjects' level of arousal prior to viewing the filmed sports activity. This result indicates that subjects in an angered state of arousal differed significantly from subjects in a non-angered state of arousal in terms of participant likeability. Comparisons of the factor level treatment means with a control revealed no significant differences in terms of subject likeability (Table XVII).

TABLE XVI

ANALYSIS OF VARIANCE PERFORMED ON THE ARONSON AND LINDER LIKEABILITY DATA IN THE VICARIOUS PARTICIPATION CATEGORY

Source	Sum of Squares	Degrees of Freedom	Mean Square	F Value
A	25.55	2	12.78	2.54
C	74.77	1	74.77	14.87**
AxC	1.78	2	0.89	0.18
Within	271.50	54	5.03	

**p<.01

TABLE XVII

MULTIPLE COMPARISON BETWEEN A CONTROL MEAN AND EACH FACTOR LEVEL TREATMENT MEAN (LIKEABILITY - VICARIOUS PARTICIPATION)

Factor Level Comparison	$\bar{X}_{K.} - \bar{X}_{0.}$
$X_{A1.} - X_{0.}$	2.54
$X_{A2.} - X_{0.}$	3.35
$X_{A3.} - X_{0.}$	1.74
$X_{C1.} - X_{0.}$	3.41
$X_{C2.} - X_{0.}$	1.42

Critical t = 3.50

*p<.05

$\bar{X}_{0.} = 3.81$

III. RESULTS - QUALITATIVE DATA

The qualitative data obtained at the conclusion of the testing session did not reveal anything detrimental to the findings of the present study. The vast majority of subjects stated that they enjoyed participating in the experiment, and felt that it was a worthwhile experience. No subject indicated that he had heard of this type of experiment before.

IV. DISCUSSION

A. AGGRESSION AND DIRECT PARTICIPATION

1. Mode of Physical Activity

The analysis of variance and accompanying orthogonal contrasts performed on the aggression machine data and the Buss-Durkee Aggression Questionnaire data indicate that only an inter-participant co-operative physical activity served to decrease subject aggressiveness in the present study. Both inter-participant competitive and inter-participant competitive-aggressive physical activities resulted in a significantly greater amount of elicited aggressiveness than participation in an inter-participant co-operative physical activity. This view was supported by the accompanying multiple comparison test. These results would indicate that introduction of the element of competition into a physical activity would be accompanied by an increase in participant aggressiveness. This inference appears justified in view of the fact that inter-participant competitive and competitive-aggressive physical activities did not differ significantly.

These findings concur with the results obtained by Deutch (1949), Dunn and Goldman (1966), Hammond and Goldman (1961), Sherif (1966), and Sherif and Sherif (1953) suggesting an aggression-inducing effect of competition.

The most logical explanation of these findings appears to be provided by Berkowitz (1962). Berkowitz suggests that competition may be viewed as a series of frustrations for both the winner and the loser. These frustrations evolve from a number of goal-blocked responses that are incurred as a result of competitive behavior. Since frustration has been professed to be a major instigator of aggressive behavior, this position appears adequate in terms of explaining the aggression-inducing effect of competitive physical activities.

An alternate explanation may be that the very nature of competition dictates that a participant be prepared to put his skills on the line against another individual or team. In this case, an expectancy of possible failure may be responsible for the increased aggressiveness towards the potential victor. Implied in this viewpoint is the assumption that the mere anticipation of engaging in competitive behavior may be responsible for increased aggressiveness, rather than the actual participation itself.

2. Outcome of Physical Activity

The analysis of variance performed on the aggression machine data and the Buss-Durkee Aggression Questionnaire data indicates that a losing outcome results in significantly more resultant

aggressiveness than is the case when the participant experiences a winning outcome . This finding was supported by the accompanying multiple comparison test.

This result appears consistent with the findings of Ryan (1970) who reported a significant difference between compete-win and compete-lose treatment conditions. The present study, however, contrary to the findings of Ryan (1970), indicates that both winning and losing are accompanied by an increase in subject aggressiveness. While losing results in a significantly greater amount of elicited aggressiveness than is the case with a winning outcome, some explanation must be forwarded to account for the increased aggression in the latter condition.

Once again, a logical explanation would be provided by Berkowitz (1962), and Layman (1970) suggesting that competition results in a series of frustrations for both the winner and the loser. This viewpoint, when taken in conjunction with the anticipation of competitive behavior notion presented earlier, adequately explains the increased aggressiveness in the winning outcome condition.

The greater amount of elicited aggressiveness in the losing outcome condition is likely a result of a higher number of goal-blocked responses during participation in the physical activity. It also seems reasonable to assume that a mental "stigma" accompanies a losing outcome. The mere realization that another individual has "beaten" the subject likely results in an increased

aggressiveness towards the victor.

3. Subject Arousal

The analysis of variance performed on the aggression machine data and the Buss-Durkee Aggression Questionnaire data revealed no significant difference, as hypothesized, between angered and non-angered arousal conditions. While no significant difference was displayed between the two groups, an interesting result emerged from the data. A supplementary test of significance (t-test) performed individually on the pretest and post test scores (Appendix K) indicated that subjects in the angered arousal condition displayed a significantly higher level of aggressiveness than their non-angered counterparts. While the angered arousal subjects displayed significantly more aggressiveness both before and after participation, they did not differ significantly from the non-angered arousal subjects in terms of difference scores from the pretest to the post test setting. This finding may be interpreted as indicative of the fact that angered subjects participating in a physical activity both start and finish higher in terms of aggressiveness than is the case with non-angered subjects.

A major implication of this finding may be that angered individuals are capable of more severe acts of aggression than would be true of non-angered participants. Although the former group displays no significant change from the latter group in terms of elicited aggressiveness, they do however start from a higher level of pre-participation aggressiveness.

B. LIKEABILITY AND DIRECT PARTICIPATION

The analysis of variance and accompanying orthogonal contrasts performed on the likeability data indicate that participation in an inter-participant co-operative physical activity resulted in greater participant likeability than was the case in the other two treatment groups. This view was supported by the accompanying multiple comparison test. This inference appears justified in view of the fact that there was no significant difference between the inter-participant competitive and the inter-participant competitive-aggressive treatment groups in terms of participant likeability. Once again, one would expect that the introduction of competition lessened participant likeability.

These results support the findings of Deutch (1949), Dunn and Goldman (1966), Sherif and Sherif (1953), and Sherif (1966), reporting a differential effect between co-operative and competitive treatment conditions in terms of inter-participant evaluations.

A supplementary explanation may be that when two individuals work together towards some common goal, the experience results in the two individuals liking each other more. This effect may be analogous to the "cohesion" witnessed among members of the same sports team.

In the present study, the outcome of participation in the physical activity did not significantly effect inter-participant likeability.

A possible explanation for this finding may be that although outcome significantly affected elicited aggressiveness, it was not perceived by the subject as important in evaluating the other individual. Following up on this point, it must also be remembered that the disguise of the experiment was such that any given subject was not aware of what was actually being measured (i.e. his aggressiveness). In the case of the likeability data, however, the boy was asked to make a conscious evaluation of the other individual. This being the case, the subjects may have consciously evaluated the individuals reasonably highly after losing in an attempt to convince themselves that losing did not result in them devaluating the other participants.

The subjects in the angered arousal condition rated the accomplice significantly lower than did those subjects in the non-angered treatment group.

Evidence from the present study would indicate that when a subject is angered prior to participation in a physical activity, this anger remains after the activity and is illustrated by significantly lower participant-accomplice likeability ratings.

Participation in a physical activity did not serve to eliminate this angered state of arousal acquired in the pre-experiment setting.

C. AGGRESSION AND VICARIOUS PARTICIPATION

1. Mode of Physical Activity Witnessed

The analysis of variance and accompanying orthogonal contrasts performed on the aggression machine data and Buss-Durkee Aggression Questionnaire data indicate that the competitive-aggressive sports film resulted in significantly more elicited aggressiveness than did the other two treatment groups. No significant difference was found between the co-operative and competitive film groups. These results would indicate that the viewing of aggressive sport models would result in increased elicited aggressiveness on the part of the subjects. This view was supported by the accompanying multiple comparison test.

This finding suports the research of Hartmann (1969), Turner (1970), Goldstein and Arms (1971), and Leith (1973), reporting an increase in subject aggressiveness after witnessing an aggressive sporting contest.

The majority of psychological research also supports the notion that the viewing of a film-mediated aggressive model serves to increase the aggressive tendencies in the viewer (Bandura, 1963, 1965; Bandura, Ross, and Ross, 1963; Baron, 1971; Berkowitz, 1962, 1965, 1968, 1969; Berkowitz et al., 1963; Bryan and Schwartz, 1971; Doob and Climie, 1972; Eron et al., 1972; Goranson, 1970; Hanratty et al., 1972; Hicks, 1965; Lovaas, 1961; Meyer, 1972; Mussen and Rutherford, 1961; Turner and Berkowitz, 1972; Walters and Thomas, 1963; Walters et al., 1963).

The present study, while supporting in part the aforementioned research, provides novel information indicating that the viewing of co-operative and competitive sports films does not result in increased aggressiveness on the part of the subject. This finding would suggest that it is the actual viewing of an aggressive model which is responsible for increased viewer aggressiveness. Three possible suggestions concerning the reason for this increased aggressiveness are provided by Berkowitz (1965). First of all, the film may have taught the individual novel aggressive responses. In this instance, new modes of aggressive behavior are learned and added to the individual's behavioral repertoire. Secondly, by merely viewing the aggressive acts, the subjects may have experienced a disinhibition against acting aggressively. Finally, it may also be the case that the observed aggression facilitates previously learned aggressive reactions, which were outside the conscious control of the subject. Given the proper environmental stimulus, these previously unconscious aggressive responses may be recalled and expressed in action.

2. Subject Arousal

The analysis of variance performed on the aggression machine data and the Buss-Durkee Aggression Questionnaire data revealed no significant difference between angered and non-angered arousal conditions.[1]

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[1] A supplementary test of significance (t-test), performed individually on the pretest and post test scores in terms of arousal level and aggressiveness may be found in Appendix K.

This finding, in conjunction with the arousal data obtained from the direct participation category would indicate that neither direct nor vicarious participation in a physical activity served to eliminate an anger-induced state in the subject. This inference would suggest that neither direct nor vicarious participation in physical activity serve to decrease subject aggressiveness whether it pertains to an immediate anger-induced state or a more general underlying predisposition.

D. LIKEABILITY AND VICARIOUS PARTICIPATION

The analysis of variance performed on the likeability data indicate that subjects in the angered arousal condition rated the accomplice significantly lower than did their non-angered counterparts. Once again, this finding suggests that once an individual acquires an angered state of arousal, this anger remains after viewing the filmed activity and is illustrated by significantly lower participant-accomplice likeability ratings in the post-experiment setting. This result was not substantiated by the accompanying multiple comparison test.

Similar results were reported in the direct participation category.

CHAPTER V

SUMMARY AND CONCLUSIONS

I. SUMMARY

The purpose of this study was to obtain a comprehensive, empirically based understanding regarding the relationship between direct or vicarious participation in physical activity and the resultant aggressiveness in the participant.

On the basis of a review of the related literature, different task strategies, outcomes, and arousals were hypothesized to differentially effect the amount of aggression resulting from participation. The three task strategies included inter-participant co-operative, inter-participant competitive, and inter-participant competitive-aggressive physical activities (in both the direct and vicarious categories). Both winning and losing outcomes, as well as angered and non-angered arousal conditions provided the remaining independent variables in the present study.

The experiment was divided into two major parts. Part A dealt with direct participation in a physical activity, while Part B investigated vicarious participation. One hundred and eighty high school boys took part in the experiment. Ten boys were randomly assigned to each of the eighteen treatment groups. In Part A, the three levels of physical activity strategy, and the two levels each of activity outcome and subject arousal resulted in twelve treatment

groups (a combination of one level from each of the three factors in Part A). In Part B of the experiment, the three levels of physical activity strategy and the two levels of subject arousal provided six treatment groups (a combination of one level from each of the two factors in Part B).

The dependent variables in the present study were the amount of shock administered by the subject in the pre-test/post-test conditions, and his scores on the Buss-Durkee Aggression Questionnaire in the pre-test/post-test settings. As an additional measure, subject-accomplice likeability was determined at the conclusion of the testing session.

Each subject's difference scores from the pre-test to the post-test conditions, as measured by the aggression machine and the Buss-Durkee Aggression Questionnaire, were recorded, and subjected to the proper analyses of variance. An identical analysis of variance was performed on the likeability scores. Orthogonal contrasts were performed on the task strategy data, when necessary, to determine which treatment sums were significantly different.

II. CONCLUSIONS

On the basis of statistical analysis and within the limitations of the study, the following conclusions appear to be justified:

Part A: Direct Participation

1. The strategy of physical activity engaged in was demonstrated to have a significant effect upon the amount of elicited

aggressiveness in the participant.

2. Inter-participant competitive and competitive-aggressive physical activities resulted in significantly more aggressiveness than did the inter-participant co-operative activity. The latter condition actually resulted in a decrease in aggressiveness.
3. Losing outcomes resulted in significantly more elicited aggressiveness than did winning outcomes.
4. Angered and non-angered arousal conditions did not differ significantly in terms of elicited aggressiveness.
5. Inter-participant co-operative physical activities resulted in significantly greater participant likeability than did inter-participant competitive and competitive-aggressive strategies.
6. Winning and losing outcomes did not differ significantly in terms of participant likeability.
7. Subjects in a non-angered state of arousal demonstrated significantly greater participant likeability than did those subjects in an angered state of arousal.

Part B: Vicarious Participation

1. The strategy of physical activity witnessed was demonstrated to have a significant effect upon the amount of elicited aggressiveness in the viewer.
2. The inter-participant competitive-aggressive sports film resulted in significantly more aggressiveness than did the inter-participant co-operative and inter-participant

competitive activities.

3. Angered and non-angered arousal conditions did not differ significantly in terms of elicited aggressiveness.
4. The strategy of physical activity witnessed revealed no significant difference in terms of participant likeability.
5. Subjects in a non-angered state of arousal demonstrated significantly greater participant likeability than did those subjects in an angered state of arousal.

Limitations

1. The experimental design utilized in the present study lends itself to the possibility of an escalation of aggression effect (Goldstein, J., Davis, R., and Herman, D., 1975). It has been suggested by the aforementioned researchers that subjects show an increased tendency to deliver stronger shocks over a number of trials. The method used in the present study, however, remains the most popular experimental means of measuring aggression in the laboratory setting. The possibility also existed whereby the subjects' responses at the aggression machine effected their subsequent answering of the Buss-Durkee Aggression Questionnaire.
2. The inter-participant co-operative physical activity strategy actually has an element of competition involved, in that the two boys are co-operating to better an "average time" calculated at London, Ontario. Inter-participant co-operation, however, was required, making this strategy a non-zero sum

contest (i.e. co-operative). The term "inter-participant" has therefore been used as a prefix to the type of physical activity strategy in an attempt to remove any ambiguity.

3. A control group was not tested in the experiment proper. At a later date, however, a control group was conducted, and included in the statistical analysis. This procedure took the form of multiple comparison tests.

Recommendations

1. A duplication of the present study utilizing only female subjects would provide interesting information concerning the effect of physical activity on elicited aggressiveness in the female. Little research has been conducted to date in this area.

2. Another interesting possibility would be to utilize two accomplices, one being the anger-instigator, with the other assuming a neutral role. Differences in elicited aggressiveness between the proposed two individuals would be expected.

3. An application of the ideas encompassed in the present study to field research would provide additional valuable information concerning the relationship between physical activity and participant aggressiveness. This would also

serve to strengthen the external validity of the results obtained by laboratory techniques.

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APPENDICES

APPENDIX A

COMMON INSTRUCTIONS

A-I

COMMON INSTRUCTIONS
DIRECT PARTICIPATION CATEGORY

First of all, I would like to thank you for helping me with this experiment.

The purpose of what we will be doing is to determine the effect of a short period of physical activity on the learning of a simple word task. In other words, do you or do you not learn faster if you have just finished participating in a physical activity?

One of you will be the learner and the other will be the teacher. You shall draw a card to determine which of these you will be.

The teacher will use the learning machine to help teach the simple task.

After showing you how the machine works, you shall use this machine for the first time. You shall then be given a series of questions to answer. Having done this, you and the other participant shall engage in a short period of physical activity. You shall then be asked to use the learning machine for the second time. Another series of questions will be given to you for answering.

Having done this, the experiment will be over.

Your complete honesty in answering the questions would be greatly appreciated.

A-II

COMMON INSTRUCTIONS
VICARIOUS PARTICIPATION CATEGORY

First of all, I would like to thank you for helping me with this experiment.

The purpose of what we will be doing is to determine the effect of a few minutes of a sports movie on the learning of a simple word task. In other words, do you or do you not learn faster if you have just witnessed a filmed sporting activity?

One of you will be the learner and the other will be the teacher. You shall draw a card to determine which of these you will be.

The teacher will use the learning machine to help teach the simple task.

After showing you how the machine works, you shall use this machine for the first time. You shall then be given a series of questions to answer. Having done this, you and the other participant shall watch a few minutes of a sports film. You shall then be asked to use the learning machine for the second time. Another series of questions will be given to you for answering.

Having done this, the experiment will be over.

Your complete honesty in answering the questions would be greatly appreciated.

A-III

COMMON INSTRUCTIONS
USE OF THE LEARNING MACHINE

The teacher in this experiment will be asked to read a series of word pairs, such as cat-tree, boy-dog, and so on. There will be twenty pairs of words.

After the teacher has read all of these word pairs once, he will then go back to the top of the list and proceed to read only the first word in each pair. The learner is asked to try to remember the second word in each of the pairs. For example, the teacher would say "cat", and the learner would try to say the right word that goes with it. If he answered correctly (with "tree" in this case), the teacher would tell him he is correct. If he said some other word, however, the teacher would then indicate a mistake by administering a shock by means of one of the ten switches. Shock #1 is the weakest, while shock #10 is the strongest. The shocks gradually get stronger from switch #1 up to switch #10.

-Demonstrate Usage

The teacher must shock the learner for each mistake. The strength of shock is determined by the teacher.

A-IV

COMMON INSTRUCTIONS
TYPE OF PHYSICAL ACTIVITY

i) Co-Operative Physical Activity

You and your partner are going to perform a three-legged race for time. I'm sure you are familiar with this type of activity. The distance that you will have to cover is sixty feet. I shall have you do this activity twice. I shall then add your times for the two races. This total score will then be compared to an average score calculated from the testing of two hundred boys in the London, Ontario area. If your time is faster than the average time, you win. If your time is slower, you lose.

- Boys are taken to starting line, and their legs are tied together. They are then shown the course, marked at each end by a one inch strip of white tape.

- The activity begins.

ii) Competitive Physical Activity

I am now going to have you each do a shuttle run for time. Mr. Ayres (Head of Boys' Physical Education) has informed me that you are all familiar with this technique. We are going to employ a thirty foot course with four chairs placed ten feet apart. The performer starts from a front lying position, hands at the side

of the chest, runs straight down and back, zig-zags down and back in and around the chairs, and finishes by sprinting thirty feet down and back.

Each of you will do this activity twice.

I shall add each of your two times together to determine which one of you have the fastest overall time.

The person with the fastest time will be the winner. The slower individual will be the loser.

- Boys are taken to the starting line and the activity begins.

iii) Competitive-Aggressive Physical Activity

The two of you are now going to play a modified version of street hockey. One of you will be the offensive player, while the other will be the defensive player. You will draw cards to see which of these you will be.

- Each boy draws a card, then the boys are taken down to the tape delineated course.

The offensive player's job is to stick-handle from the starting line to the finish line, a distance of twenty yards. This is to be accomplished as quickly as possible.

The defensive player is to prevent the offensive player from crossing the finish line. Stick-checking and body-checking are both allowed.

This activity will be performed twice.

The total time from the two trials will be compared to an average time calculated on two hundred high school boys in London, Ontario.

If the offensive player's time is faster than this average time, he wins. If the offensive player's time is faster than this average time, he wins. If the offensive player's time is slower than the average time, the defensive player wins.

- The activity begins.

APPENDIX B

LETTER OF PARENTAL CONSENT

April, 1975.

Dear Parent/Guardian:

Your son has recently been chosen to participate in an experiment to be conducted at Wallaceburg District High School during the month of May, 1975.

Approval of this endeavor has been graciously granted by the following school officials:

Mr. B. Green
Principal
W.D.S.S.

Mr. T. Ayres
Head of Physical Education
W.D.S.S.

The purpose of this experiment is to test the effect of a short period of physical activity (approximately three minutes) on the learning of a simple word association task. Only thirty minutes of time will be required from your son during one of his Physical Education classes.

Individual student names shall not be recorded to ensure privacy of results from the test.

Shortly after all tests have been conducted, I shall personally send you an abstract stating the findings from the proposed study, and suggesting possible implications to be drawn from the results.

Your co-operation in dealing with this very important issue would be most appreciated.

If you are willing to allow your son to participate in this experiment, please sign you name on the space provided below.

Thanking you for your co-operation in advance, I am,

Sincerely,
Larry M. Leith
Director of Athletics
Lambton College
Sarnia, Ontario.

I hereby authorize permission for my son to participate in the experiment outlined above.

_____

Please have your son return this signed form to his Physical Education Teacher.

APPENDIX C

DESCRIPTION OF PHYSICAL ACTIVITIES

i) The Co-Operative Physical Activity

The co-operative physical activity utilized in this study was a three-legged race for time.

A thirty foot course was delineated on the floor with one inch wide tape.

The subjects were required to advance to the starting line where their legs were tied together (the right leg of one individual with the left leg of the other). They were then instructed to race down to the thirty foot marker, turn around, and race back. This was to be done as quickly as possible.

The subjects were told that their two times over the sixty foot course would be added together, then compared to an average score or norm calculated from the testing of two hundred high school boys in the London, Ontario school system. It was then pointed out that if their time was faster than the average time, they were winners. If the time was slower, they were losers.

At this point, the activity took place, and was timed by means of a stop-watch. The two times were added together and the subjects were told if they had won or lost.

In actuality, however, no such average score existed. It therefore only remained for the Experimenter to report an average score either faster or slower than the subject's time depending upon whether the boy had been predetermined to win or lose.

This average score was theoretically kept in a file folder, which was consulted by the Experimenter at the conclusion of the two time trials.

ii) The Competitive Physical Activity

The competitive physical activity utilized in this study was a shuttle run for time.

A thirty foot course is marked out on the floor with four chairs placed ten feet apart.

The performer starts from a front lying position, hands at the side of the chest, runs straight down and back, zig-zags down and back in and around the chairs, then finishes by sprinting thirty feet down and back.

The activity is performed twice by both the subject and the accomplice.

Each individual's two times were added together to provide a total score.

The person with the fastest total time is told that he is the winner. In actuality, however, the Experimenter had predetermined whether the subject would win or lose. Since a stopwatch was utilized over two trials as a criterion for success or failure, it was easy for the Experimenter to "fix" the results.

iii) The Competitive-Aggressive Physical Activity

The competitive-aggressive physical activity utilized in this study was a modified version of street hockey.

The two boys were instructed that one of them would be the offensive player and one would be the defensive player. Each boy was asked to draw a card to determine which of the two he would be. In actual fact, however, both of the cards read "offensive player". The accomplice had been previously instructed to say that his card read "defensive player". This being the case, the subject in the experiment always assumed the offensive player role.

The offensive player (the subject) was instructed that his job was to stick-handle a street hockey ball from a starting line to a finish line as quickly as possible. The course covered a distance of twenty yards.

The defensive player was instructed that his job was to prevent the offensive player from crossing the finish line. Stick-checking and body-checking were both allowed. In actual fact, however, the accomplice had been instructed to impede the offensive player only three or four times, with at least two body-checks, then miss a stick-check attempt enabling the offensive player to reach the finish line.

This activity was performed twice.

The boys were told that the total time for the two trials would be compared to an average time calculated on two hundred

high school boys in London, Ontario.

The offensive player was told that if his time was faster than the average time, he would be the winner. If the offensive player's time was slower than the average time, the defensive player would be the winner.

In actual fact, however, the Experimenter had predetermined whether the subject would win or lose. It therefore only remained for the Experimenter to report an average time either faster or slower than the subject's time. This reported time was dependent upon whether the subject had been predetermined to win or lose.

This average score was theoretically kept in a file folder, which was consulted by the Experimenter at the conclusion of the two time trials.

APPENDIX D

DESCRIPTION OF FILMED PHYSICAL ACTIVITIES

i) The Co-Operative Physical Activity Film

The co-operative film utilized in this study involved two-man sail-boating.

The film went into adequate detail revealing how the two individuals in the boat must work together to obtain best results.

The objective of the sailors was to reach maximum speed under the conditions of the day.

The film was made available by Molson's Film Library.

ii) The Competitive Physical Activity Film

The competitive film utilized in this study involved a singles tennis match.

The film adequately revealed how the relative tennis skills of the two individuals were responsible for determining the winner and loser of any given rally, as well as the match.

The objective of each player was to defeat the other individual.

The film belonged to the Experimenter.

iii) The Competitive-Aggressive Physical Activity Film

The competitive-aggressive film utilized in this study involved a boxing contest.

The objective of each boxer was to defeat the other individual by the use of instrumental aggression.

The film was made available from Molson's Film Library.

APPENDIX E

WORD ASSOCIATION TASKS,

FIXED ACCOMPLICE MISTAKES,

AND SHOCK RECORDING SHEETS

E-I

WORD PAIRS
TRIAL ONE

Please read the following word pairs out loud to the learner one time. Having done this, proceed to read the first word in each pair. The learner is to answer with the correct word opposite it. If he is correct, say "correct". If he is incorrect, administer the shock of your choice.

1. cat-tree
2. blue-nut
3. book-girl
4. pen-queen
5. bag-plane
6. top-ice
7. string-horse
8. case-verb
9. broom-paper
10. water-circle
11. box-fork
12. animal-basket
13. ball-truck
14. board-can
15. grass-step
16. chicken-mirror
17. statue-carpet
18. athlete-boat
19. film-circus
20. cabinet-fool

E-II

WORD PAIRS
FIXED ACCOMPLICE MISTAKES
AND SHOCK RECORDING SHEET
TRIAL ONE

Please respond in this trial with the following answers. The subject will say the first word, and you will answer with the one beside it. Record the level of shock in the space provided to the right. Mistakes are marked with an asterisk.

		S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	S_{10}
1.	cat-tree										
2.	blue-girl*										
3.	book-horse*										
4.	pen-queen										
5.	bag-plane										
6.	top-ice										
7.	string-cube*										
8.	case-verb										
9.	broom-paper										
10.	water-basket*										
11.	box-fork										
12.	animal-cracker*										
13.	ball-step*										
14.	board-can										
15.	grass-cigarette*										
16.	chicken-mirror										
17.	statue-park*										
18.	athlete-man*										
19.	film-candy*										
20.	cabinet-fool										

E-III

WORD PAIRS
TRIAL TWO

Please read the following word pairs out loud to the learner one time. Having done this, proceed to read the first word in each pair. The learner is to answer with the correct word opposite it. If he is correct, say "correct". If he is incorrect, administer the shock of your choice.

1. car-cover
2. mouse-envelope
3. curtain-fish
4. bat-wrapping
5. puck-mud
6. spider-handle
7. bicycle mat
8. pail-tennis
9. ruler-poison
10. pad-journey
11. polish-face
12. arrow-uncle
13. window-pie
14. notice-cement
15. racket-pool
16. kiss-tire
17. ant-letter
18. floor-target
19. apple-wall
20. tack-snake

E-IV

FIXED ACCOMPLICE MISTAKES
AND SHOCK RECORDING SHEET
TRIAL TWO

Please respond in this trial with the following answers. The subject will say the first word, and you will answer with the one beside it. Record the level of shock in the space provided to the right. Mistakes are marked with an asterisk.

		S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	S_{10}
1.	car-cover										
2.	mouse-poison*										
3.	curtain-fish										
4.	bat-wrapping										
5.	puck-handle*										
6.	spider-mud*										
7.	bicycle-mat										
8.	pail-tennis										
9.	ruler-pencil*										
10.	pad-journey										
11.	polish-wrapping*										
12.	arrow-target*										
13.	window-pie										
14.	notice-cement										
15.	racket-tennis*										
16.	kiss-tire										
17.	ant-house*										
18.	floor-mat*										
19.	apple-circle*										
20.	tack-snake										

APPENDIX F

THE INSTRUMENT

F-I

PART A

Please respond to the following statements. Circle T if the statement applies to you. Circle F if it does not.

	True	False
1. Once in a while, I cannot control my urge to harm others.	T	F
2. If somebody hits me first, I let him have it.	T	F
3. People who continually pester you are asking for a punch in the nose.	T	F
4. When I really lose my temper, I am capable of slapping someone.	T	F
5. If I have to resort to physical violence to defend my rights, I will.	T	F
6. I sometimes spread gossip about people I don't like.	T	F
7. When I am mad, I sometimes slam doors.	T	F
8. When I am angry, I sometimes sulk.	T	F
9. Since the age of ten, I have never had a temper tantrum.	T	F
10. I sometimes show my anger by banging on the table.	T	F
11. I am always patient with others.	T	F
12. It makes my blood boil to have somebody make fun of me.	T	F
13. Sometimes people bother me just by being around.	T	F
14. I sometimes carry a chip on my shoulder.	T	F
15. I don't let a lot of unimportant things bother me.	T	F
16. Unless somebody asks me in a nice way, I won't do what they want.	T	F
17. When someone is bossy, I do the opposite of what he asks.	T	F

	True	False
18. Occasionally when I am mad at someone I will give him the "silent treatment".	T	F
19. I often find myself disagreeing with people.	T	F
20. I demand that people respect my rights.	T	F
21. If somebody annoys me, I am apt to tell him what I think of him.	T	F
22. When I get mad, I say nasty things.	T	F
23. I often make threats I don't really mean to carry out.	T	F
24. I generally cover up my poor opinion of others.	T	F

F-II

PART B

Please respond to the following statements. Circle T if the statement applies to you. Circle F if it does not.

	True	False
1. I can think of no good reason for ever hitting anyone.	T	F
2. Whoever insults me or my family is asking for a fight.	T	F
3. I seldom strike back, even if someone strikes me first.	T	F
4. I get into fights about as often as the next person.	T	F
5. I have known people who pushed me so far that we came to blows.	T	F
6. I never get mad enough to throw things.	T	F
7. I never play practical jokes.	T	F
8. I sometimes pout when I don't get my own way.	T	F
9. I can remember being so angry that I picked up the nearest thing and broke it.	T	F
10. I lose my temper easily but get over it quickly.	T	F
11. I am irritated a great deal more than people are aware of.	T	F
12. If someone doesn't treat me right, I don't let it annoy me.	T	F
13. I often feel like a powder keg ready to explode.	T	F
14. I can't help being a little rude to people I don't like.	T	F
15. Lately, I have been kind of grouchy.	T	F
16. When someone makes a rule I don't like, I am tempted to break it.	T	F

	True	False
17. When people are bossy, I take my time just to show them.	T	F
18. When I disapprove of my friends' behavior, I let them know it.	T	F
19. I can't help getting into arguments when people disagree with me.	T	F
20. Even when my anger is aroused, I don't use "strong language".	T	F
21. When people yell at me, I yell back.	T	F
22. I could not put someone in his place even if he needed it.	T	F
23. When arguing, I tend to raise my voice.	T	F
24. I would rather concede a point than get into an argument about it.	T	F

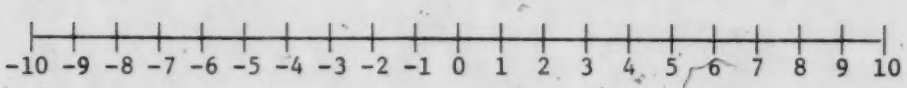
F-III

PART C

Please complete the following questions.

1. Please indicate on the following scale, how much you liked the other boy that was in the room (the learner in the experiment). On this scale, a +10 would mean that you liked him very much. A -10 would mean you really disliked him. A 0 means you neither liked nor disliked him.
You can also check any one of the other numbers in between.

   What point on the scale do you feel reflects your feelings toward the boy most accurately?



2. Did you enjoy participating in this experiment? Yes___ No___.

3. Did you understand your instructions? Yes___ No___.

4. Had you heard of this experiment before coming to the experimental room? Yes___ No___.

5. If you answered yes to question #4, please explain what you had heard.

_____

_____

_____

_____

F-IV

PART D

Please complete the following questions.

1. How would you classify the game you just participated in? Please circle what you feel would be the correct answer.
   a) A game in which two people work together to determine if you win or lose;
   b) A game in which two people compete against one another, where the difference in ability between you and your opponent determines the winner and the loser;
   c) A game in which both a certain amount of physical contact and the difference in ability between you and your opponent determine the winner and the loser.

   Comments, if any ... _____

2. In the activity just participated in, did you win or lose?
   Check one... Win___ Lose___
   Comments, if any ... _____

3. At any time during the experiment, did the other participant ever make you angry? Yes ___ No___
   If you answered yes above, when did this happen? _____

4. How much do you think the shocks hurt the learner in this experiment?
   a) very much
   b) quite a bit
   c) not very much
   d) not at all

   Comments, if any... _____

5. What was your overall opinion of this experiment? _____

F-V

PART D

Please complete the following questions.

1. How would you classify the game you just witnessed? Please circle what you feel would be the correct answer.

   a) A game in which two people work together to determine if they win or lose;
   b) A game in which two people compete against one another, where the difference in ability between the two determines the winner and the loser;
   c) A game in which both a certain amount of physical contact and the difference in ability between the two determine the winner and the loser.

   Comments, if any... _____

2. At any time during the experiment, did the other participant ever make you mad or angry? Yes___ No___
   If you answered yes above, when did this happen? _____

3. How much do you think the shocks hurt the learner in this experiment?

   a) very much
   b) quite a bit
   c) not very much
   d) not at all

   Comments, if any... _____

4. What was your overall opinion of this experiment? _____

APPENDIX G

RESULTS OF BUSS-DURKEE

SPLIT-HALF RELIABILITY TESTING

TABLE A-I

SPLIT-HALF RELIABILITY OBTAINED AS A RESULT OF ADMINISTRATION OF BUSS-DURKEE AGGRESSION QUESTIONNAIRE TO A HIGH SCHOOL SAMPLE

n=	25
Mean Score=	23.2
Range=	16-32
Standard Deviation of Test=	3.88
Standard Deviation of Odd Number Q's=	1.95
Standard Deviation of Even Number Q's=	2.27
Split-Half Reliability of Test=	.82

APPENDIX H

RESULTS OF AGGRESSION MACHINE TEST/RESULT RELIABILITY TESTING

TABLE A-II

TEST/RESULT RELIABILITY OBTAINED AS A RESULT OF ADMINISTRATION OF AGGRESSION MACHINE PROCEDURE TO A HIGH SCHOOL SAMPLE

n=	25
Mean of Test Scores ($\bar{X}$)=	44.4
Mean of Retest Scores ($\bar{Y}$)=	45.0
Summation of Test Variances ($X-\bar{X}$)=	1509.2
Summation of Retest Variances ($Y-\bar{Y}$)=	1620.0
Summation of Test/Retest Standard Deviation Products $(X-\bar{X})(Y-\bar{Y})$=	1437.4
Test-Retest Reliability=	.92

APPENDIX I

PILOT TESTING RESULTS ASCERTAINING SUBJECTS' PERCEPTIONS OF INDEPENDENT VARIABLES UTILIZED IN THE STUDY, AS MEASURED BY APPENDIX F-IV (DIRECT PARTICIPATION CATEGORY)

TABLE A-III

RESULTS OF PILOT TESTING ASCERTAINING SUBJECTS' PERCEPTIONS OF THE INDEPENDENT VARIABLES (ACTIVITY STRATEGY, OUTCOME, AND MODE) UTILIZED IN THE PRESENT STUDY (DIRECT PARTICIPATION CATEGORY)
N=24

Factor	Level	Number of Subjects	Number of Correct Interpretations	Percentage Correct Interpretations
A (Activity Strategy)	Co-Operative	8	8	100%
	Competitive	8	7	88%
	Competitive-Aggressive	8	8	100%
B (Outcome)	Win	12	12	100%
	Lose	12	12	100%
C (Arousal)	Non-Angered	12	12	100%
	Angered	12	10	83%

APPENDIX J

SUBJECTS' ACTUAL PERCEPTIONS OF INDEPENDENT VARIABLES UTILIZED IN THE STUDY (DIRECT AND VICARIOUS PARTICIPATION CATEGORIES), AS MEASURED BY APPENDIX F-IV AND F-V

TABLE A-IV

RESULTS INDICATING SUBJECTS' PERCEPTIONS OF INDEPENDENT VARIABLES (ACTIVITY STRATEGY, OUTCOME, AND AROUSAL) UTILIZED IN THE PRESENT STUDY (DIRECT PARTICIPATION CATEGORY)
N=120

Factor	Level	Number of Subjects	Number of Correct Interpretations	Percentage Correct Interpretations
A (Activity Strategy)	Co-Operative	40	40	100%
	Competitive	40	38	95%
	Competitive-Aggressive	40	38	95%
B (Outcome)	Win	60	60	100%
	Lose	60	60	100%
C (Arousal)	Non-Angered	60	59	98%
	Angered	60	55	92%

TABLE A-V

RESULTS INDICATING SUBJECTS' PERCEPTIONS OF INDEPENDENT VARIABLES (FILMED PHYSICAL ACTIVITY, AND AROUSAL) UTILIZED IN THE PRESENT STUDY (VICARIOUS PARTICIPATION CATEGORY)
N=60

Factor	Level	Number of Subjects	Number of Correct Interpretations	Percentage Correct Interpretations
A (Filmed Activity)	Co-Operative	20	17	85%
	Competitive	20	19	95%
	Competitive-Aggressive	20	20	100%
C (Arousal)	Non-Angered	30	30	100%
	Angered	30	28	93%

APPENDIX K

SEPARATE TESTS OF SIGNIFICANCE (t-Test)

PERFORMED ON THE ANGERED AND NON-ANGERED AROUSAL

CONDITIONS IN BOTH THE PRETEST AND POST TEST

SETTINGS (DIRECT AND VICARIOUS PARTICIPATION CATEGORIES)

TABLE A-VI

MEAN GROUP SCORE DIFFERENCES BETWEEN ANGERED AND NON-ANGERED SUBJECTS IN BOTH THE PRETEST AND POST TEST CONDITIONS (DIRECT AND VICARIOUS PARTICIPATION CATEGORIES) AS MEASURED BY THE AGGRESSION MACHINE

Group	Mean Score of Angered Subjects	Mean Score of Non-Angered Subjects	X-X	Required Value of t	t
Pretest, Direct Participation	42.2	34.3	7.9	1.98	7.31**
Post Test, Direct Participation	44.5	36	8.5	1.98	5.63**
Pretest, Vicarious Participation	42.2	37.4	4.8	2.00	2.60*
Post Test, Vicarious Participation	45.5	40.0	5.5	2.00	3.29**

*p .05
**p .01

APPENDIX L

SUBJECTS' PERCEPTIONS REGARDING THE AMOUNT OF PAIN

INFLICTED BY THE AGGRESSION MACHINE

TABLE A-VII

SUBJECTS' PERCEPTIONS REGARDING THE AMOUNT OF PAIN INFLICTED BY THE AGGRESSION MACHINE

Subjects	Perceived Pain	Number of Respondents	Percentage Response
1. PART A			
	A. Very Much	14	12%
	B. Quite a Bit	73	61%
	C. Not Very Much	29	24%
	D. Not at all	4	3%
2. PART B			
	A. Very Much	5	8%
	B. Quite a Bit	34	57%
	C. Not Very Much	19	32%
	D. Not at all	2	3%

APPENDIX M

THE ACCOMPLICE

THE ACCOMPLICE

The accomplice, one Robert Borody, was an eighteen year old resident of Sarnia, Ontario. His physical stature was comparable to that of the majority of subjects, while his physical skills were far above average for his age group. The same accomplice was utilized throughout the duration of the experimental testing.

The accomplice was at all times kept uninformed as to which treatment the subject being tested belonged. This was done in an attempt to prevent any differential behavior by the accomplice over the respective experimental treatments.

The accomplice was instructed to refer any questions asked by the subject to the experimenter.

No talking and no verbal cues were permitted during the aggression machine procedure or during the answering of the questionnaire data.